NAVICONTROL
AP3003 gold
AUTOPILOT

INSTRUCTION MANUAL
FOR
USE & INSTALLATION

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FOREWORD

Thank you for purchasing a NAVICONTROL product and congratulations for your excellent choice.

You have now become the owner of a powerful and versatile electronic instrument which will make your moments of relax or work, at sea, more pleasant and secure.

You will be pleasantly surprised when you realize how easy and logical this system is to use, though technologically sophisticated.

No particular technical or nautical know-how is required for its correct use, nevertheless reading this manual with some attention will allow you to quickly learn and become confident in using it at its best.

WARRANTY

The company **Navicontrol s.r.l.**, located in Viareggio - via dei Comparini, 39/24 (hereinafter named **Navicontrol**), will guarantee the following:

1. **Navicontrol** products are guaranteed free from faults concerning materials and production. Therefore, any product showing a malfunction deriving from faulty manufacture or defective materials will be promptly replaced.

2. Warranty is limited to possible faults found within the first 24 months of purchase and installation.

3. Repair under guarantee will be carried out, free of charge, on faulty products which will be directly sent to **Navicontrol**. Any shipping, customs, packing and insurance costs are to Purchaser's account.

4. Warranty does not cover damage or malfunctioning deriving from improper use, installation or manipulation as well as deterioration due to normal use.

5. **Navicontrol** will not accept responsibilities on its products other than those mentioned above. It is also understood that Navicontrol will in no case be considered responsible for any kind of direct or indirect damage that may occur to people, animals or things due to the use of its products.

6. Any repair carried out by personnel unauthorized by **Navicontrol** will determine the immediate cancellation of warranty cover.

7. The use of **Navicontrol** products or services implies the complete acceptation of the present sale-conditions on behalf of the purchaser and of the user.

THE AP3003 gold AUTOPILOT

The AP3003 gold autopilot belongs to the latest generation in marine equipment where advanced research, sophisticated electronic technology and special care in quality standard, blend together so as to ensure a highly efficient, reliable, versatile and extendible product at a competitive cost.

It is however important to bear in mind the autopilot is made for seafaring and, due to rudder physical and mechanical limits, therefore cannot counteract a sharp variation of bow (such a sudden wave that may hit the vessel), but can only dampen the effect.

Steering parameters which vary within a wide range, make the autopilot easily suitable to all kind of vessel.

The main processing unit (framed in the Processor Box) brings the necessary corrections to the position of the rudder automatically, in order to guaranteeing the best maintenance of course.

The precision of routing is granted by a provided magnetic compass and can be integrated with external instruments (such a gyrocompass, turn rate sensor, GPS).

The control unit is provided with a large backlite LCD, easy-to-read in any light conditions (even at night).

In greater crafts provided with upper decks, it is possible to control the system thanks to the remote stations installed in different areas of the vessel.

Having purchased the AP3003 gold autopilot, you have acquired an autopilot which will prove itself an extremely helpful instrument for travelling.

DICHIARAZIONE DI CONFORMITÀ
EC STATEMENT OF COMPLIANCE

Fabbricante: *Manufacturer*:	**NAVICONTROL S.r.l.** Via dei Comparini, 39/24 55049 Viareggio (LU) Italy
Prodotto: *Eut*:	**AP3003 GOLD / AP801** **AP303 GOLD / AP401** **AP103 GOLD / AP201** with **FB30, FGX90/N, PB 80/250/350** **TELECOMANDO PORTATILE RS32** **TELECOMANDO REMOTO RC34** **TELECOMANDO REMOTO ART35** **INDICATORE ANGOLO TIMONE AR32** **INDICATORE ANGOLO TIMONE AR33** **INDICATORE ANGOLO TIMONE AR34** **SENSORE MAGNETICO FGX60/3** **GYRONAV SENSOR**
Norme Applicate**:** *Applied Standards***:**	CEI EN 60945 (2003/11) Apparecchiature e sistemi di navigazione marittima e di radiocomunicazione - Prescrizioni generali - Metodi di prova e risultati delle prove richieste *Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results*

Con la presente si dichiara che il prodotto specificato è conforme alle normative sopra riportate e soddisfa i requisiti essenziali richiesti dalle Direttive: 2004/108/CE (Direttiva EMC).

Manufacturer declare under our own responsibility that the product meets the requirements set by the standard above mentioned and by the Directive 2004/108/EC

Viareggio, 31/03/2009

CE

L'Amministratore Delegato / *The Managing Director*
Alessandro Lazzeri

JOHNSON OUTDOORS

NAVICONTROL
AP3003 gold
AUTOPILOT

USER'S MANUAL

IMPORTANT WARNINGS

Seafaring experience is made exclusively at sea and not on land. So when you go out at sea, please do remember to take this manual with you and you will quickly learn to use the autopilot in the simplest and most logical way: actually using it.

To ensure your own and your passenger's safety, we recommend do not exploit your autopilot on occasions such as:
1. while maneuvering in particular shallow waters or over dangerous seabeds
2. while entering or exiting harbour, mooring and setting sail
3. in heavy traffic areas, near to breakwaters, canals and any kind of obstacle.

While your autopilot is operative on **AUTO**, **NAV** or **WIND,** be sure you do not abandon deck.

While learning, make sure you practice in open sea, far from shallow water, vessels or other obstacles.

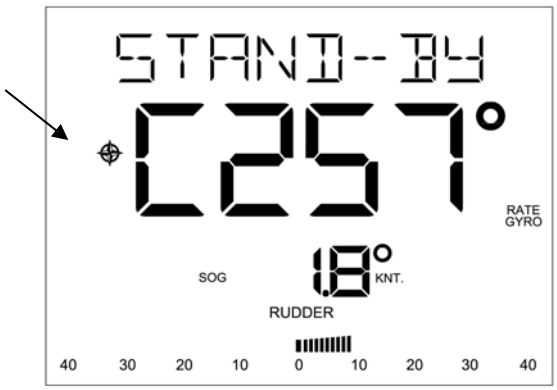
Multisensor Technology

The entire autopilots ready to this kind of technology are able to get the maximum result from the three different heading sensors: fluxgate compass (FGX90, FGX60), GYRONAV rate sensor stabilizer, GPS receiver.

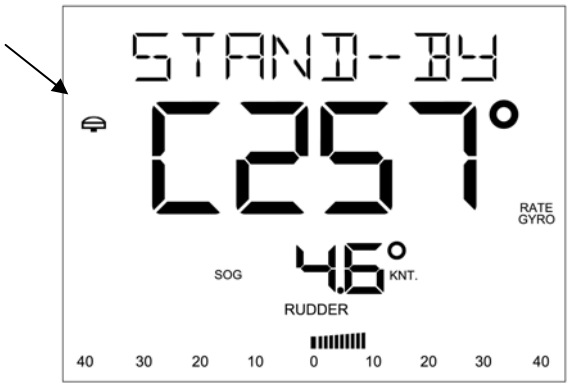
The ***Multisensor Technology*** can be enabled in the entire Navicontrol Gold series autopilots only if:

1) the software release is 1.18 or higher
2) the Gyronav sensor is correctly installed and enabled
3) the "MULTISENSOR" function (installation menu) is enabled.

This system manages the choice of the main sensor, time by time, basing it upon a reliability matter (fluxgate compass at low speed, GPS sensor at medium and high speed). The Gyronav stabilizer is always active.
Obviously, if a black-out of the GPS receiver occurs, the autopilot holds the setted course by using the fluxgate compass as back-up.
The main sensor is displayed by showing the respective icons:



main sensor: fluxgate compass



main sensor: GPS

Pay attention:
The changeover between fluxgate compass and GPS is done at a speed of about 4 knots. If your fluxgate compass is interfered or not correctly aligned, you may see a rapid change of the visualized heading in the proximity of that speed. This kind of situation is normal and hazard-free: in fact, the changeover between the two sensors happens only when the autopilot is not engaged (STANDBY mode).

Obviously, if you don't want to use the Multisensor Technology feature, you may leave the "MULTISENSOR" function (install menu) setted to OFF.

PRELIMINARY OPERATIONS AND START OF NAVIGATION.

Starting

Switch on the control panel and wait until the autopilot has performed the autodiagnostic test and visualizes the software identification codes.

At this stage, the system is in STANDBY so ready to be set.

Warning:
The first time that you use the autopilot, verify that the bearing of the compass shown by the display corresponds to the value determined by the vessel compass. In case of significant differences call a technician for a proper setting.
Furthermore, it is normal that in a system provided with the analogue rudder angle indicators, the values shown by the Control Unit may slightly differ from the one visualized by the instrument itself.

Display and keyboard illumination

Press the ☼ (light bulb) key in order to adjust the level of backlight of the display and keyboard: the autopilot has an 8 level of brightness.

Setting of the operating parameters

Enter the menu of operating parameters (YAW, RUDD, C.RUDD and T.RATE) by pressing the **SET** key. In order to change the values, press and release the **SET** key until the name of the parameter flashes, then select by pressing the arrow keys ◀ and ▶.
You exit the menu by pressing the set key or after few seconds of keyboard inactivity.
Obviously, the parameters are related to the operating program in that moment.

PROG

This autopilot conceived for greater working crafts as well as steering difficulties, allows memorizing up to 3 different programs according to the use of it.
In fact it is possible to memorize the four main operating parameters (YAW, RUDD, C.RUDD, T.RATE) in three different packages (named PROGRAM 1, 2, 3) which can be selected by pressing the key **PROG**. In order to avoid any accidental change of program, the selection of it may be done only by pressing continuously the key **PROG** for at least one second.
In this way, once all the values have been set, it is possible to use the autopilot in different conditions by selecting the preset program (avoiding, in this way, to be set every time).

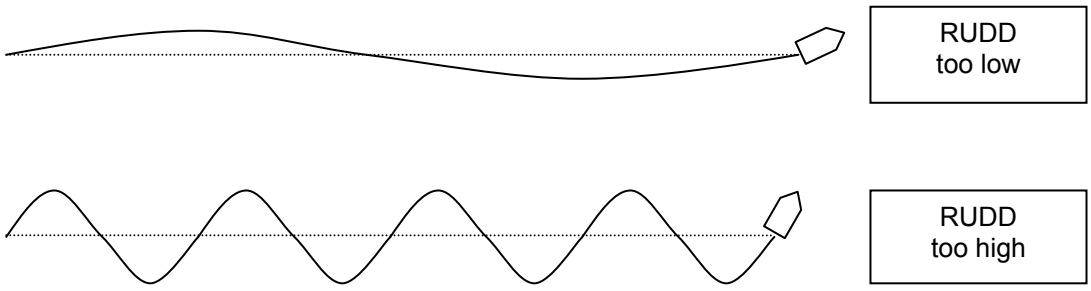
The display of the Control Unit visualizes the number of the program which is operating at that time.

YAW

In some other autopilots, it is also named SEA or WEATHER and indicates the width of the channel in which the vessel navigates. The higher the value is and the higher the slack is respect to the course to be followed. The lower the value is and the more precise is the course.

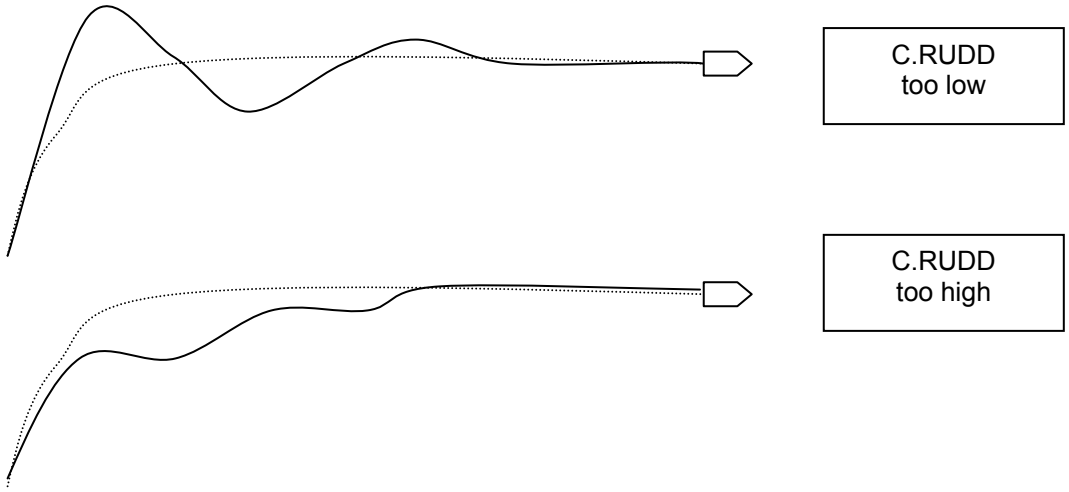
RUDD

It is the main parameter and corresponds to the gain of the vessel. This value is higher in which need a great deal of rudder quantity and vice-versa.
If the set value is higher respect to the optimum condition, the maintaining of the course will be instable (the vessel corrects continuously by "snaking" around the selected course).
If the set value is lower, the vessel cannot enter the selected course in reasonable time.
Normally, the RUDD value must be increased at low speed and decreased at high speed. In order to set the right value, put the autopilot in AUTO and look at the followings:



C.RUDD

It is the parameter which corresponds to the counter-rudder. The counter-rudder is the function which compensates the inertia effect of the vessel: usually the higher inertia the vessel has and the higher this value must be.
Normally this parameter is close to 0 in small vessels.
In order to set the right value, put the autopilot in AUTO, make a course change and look at the followings:



T.RATE

This parameter, which corresponds to the turn rate expressed in degrees per second, restricts the quantity of rudder during the turns. The higher the value is and the faster the turns are.
Please, lower the value at high speed.

Setting of the route and automatic navigation

The high versatility of the autopilot allows setting the desired course in a variety of modes:

Course setting by "bow targeting"

It just consists in orienting the vessel towards the desired target and instructing the autopilot to assume the current bearing as the route to be done:

- autopilot in **STANDBY**
- steady the vessel on the required heading by turning manually the wheel of the rudder
- position the rudder to the dynamic center and press **AUTO**

Wishing to change the selected course, even during the navigation, it will be sufficient to modify the shown value by turning the knob or the arrow keys (◀ and ▶).

Setting of the course

Independently from the bow targeting, position the rudder to the dynamic center and press AUTO. By turning the knob or the arrow keys, select any course and the autopilot will execute automatically the operation.

Geographical course

If the system is equipped with a GPS or a chart-plotter correctly installed and interfaced with the autopilot, it is possible to change any followed magnetic course (**AUTO** mode) in a geographical course and any leeway or drift will be automatically corrected (**AUTO-TRACK** mode). You only need to press the key **TRACK** in order to execute this operation.
At that moment, the autopilot will enter the **AUTO-TRACK** mode which allows to change the magnetic course in geographical course by taking as a starting point, the position which the vessel had at the time of pressing the key.
In order to modify the course, it is necessary to reset auto-mode by pressing **AUTO**, set the new course and then press the **TRACK** key once again.

Tack change

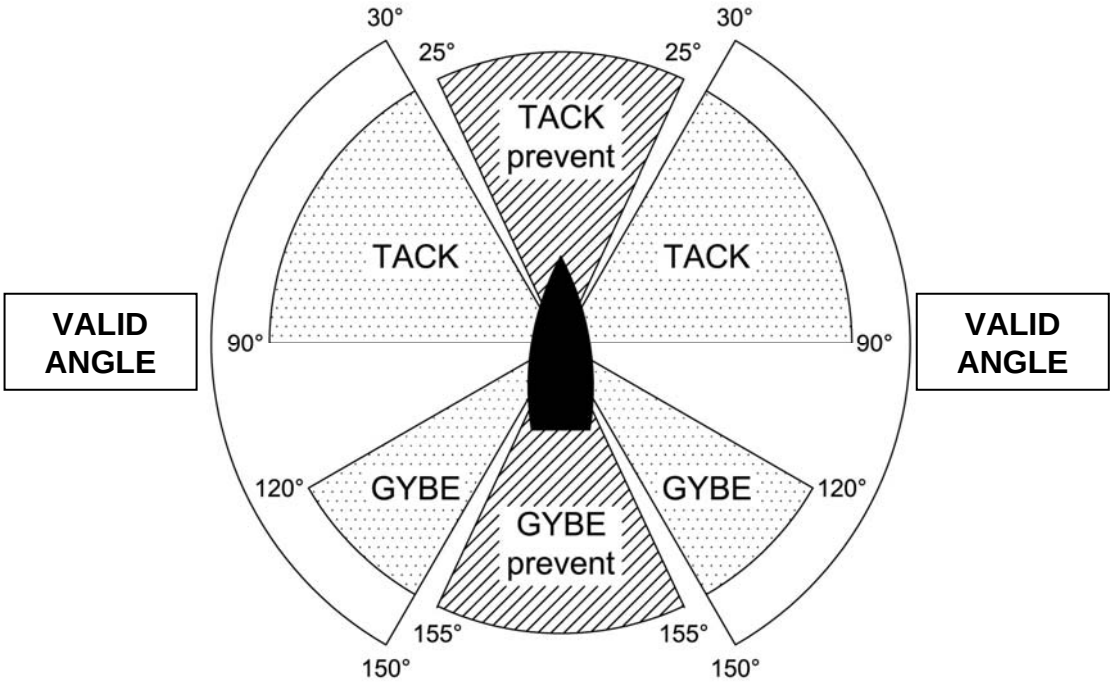
Particularly indicated in sailing vessels, the tack change is the operation which allows the changing of tacks. This function can be carried out automatically only during the **AUTO** mode.
The tack change is activated by pressing and releasing simultaneously the keys ◀ and ▶ : if you press again, within 5 seconds, the direction arrow key, the autopilot will execute the course change which correspond to the opposite tack. During these 5 seconds, it is possible to modify the degree quantity of the turning angle by turning the knob.
The tack change is always carried out by facing the direction of the wind.

Instrumental navigation with GPS

If provided with a GPS or a chart-plotter correctly installed and interfaced with the autopilot, it is possible to set a course on these equipments to be followed automatically with the autopilot.
In fact, you only need to insert one or more waypoints (see GPS or chart-plotter manuals) and to set the autopilot in **NAV** mode (by pressing the **NAV** key). From this moment, the autopilot will be controlled by the satellite instrument and it will execute automatically any possible selected course changes.
Obviously, in this kind of functioning, the course to be followed is controlled by the satellite instrument and so it can't be modified by the autopilot. For this reason, the knob and the arrow keys (◀ and ▶) are deactivated.
The autopilot can be connected to a maximum of two satellite instruments (e.g. main-deck and flying-bridge). It is possible to select which of the two must be followed by simply the key **NAV** until visualizing the number of the plotter to be followed: of course, **NAV1** refers to the plotter connected to the input number 1 and **NAV2** to the input number 2 (see Processor Box, TB1 connector).
Pay attention: if the input NAV2 has been settled for the wind direction sensor (**WIND** mode), it is not possible to interface the second GPS / chart-plotter to the autopilot.

Navigation with wind direction sensor

If provided with a wind direction sensor, correctly installed and interfaced with the autopilot, it is possible to set a tack angle to be followed automatically.
In fact, you only need to select the **WIND** mode of the autopilot by pressing the key **NAV** until the **WIND** is visualized).
From this moment, the autopilot will be controlled by the direction of the wind and it will follow any change of direction automatically. Obviously, it is possible to change, at any time, this angle within certain limits, by turning the knob.
By pressing the arrow key (◀ or ▶) corresponding to the right side, it is possible to carry out the tack change. For safety reasons, this function can be activated only by pressing twice the right direction within few seconds.
The tack change is carried out by facing always the direction of the wind.



Follow-Up

This autopilot has the possibility to execute the follow-up operation directly with the control unit knob.
In fact, you only need to press the **FW-UP** key to activate this function, and then turning it.
In addition, bear in mind that the activation of the follow-up mode deactivates any automatic mode of the autopilot.
During maneuvers carried out in follow-up, any pressing of **STBY**, **AUTO**, **NAV** and **TRACK** keys causes the immediate disactivation of this function.

Turn

The TURN function is activated only when the autopilot is in **AUTO** mode.

In automatic mode (**AUTO**) and by pressing the **TURN** key, it is possible to execute one of the following turns:

- U TURN (180° turn)
- O TURN (360° turn)
- 8 TURN (360° turn followed by another 360° turn in the opposite direction)

The selection of the kind of turning is activated by pressing and releasing the **TURN** key until the desired kind is shown. Within few seconds, the arrow key which corresponds to the starting direction must be pressed.
In order to stop these specific turnings, you only need to press a key (with the exception of **PROG**, **SET**, ◀ and ▶) or by actioning the external tiller.
All these turnings are controlled by the value of the TURN RATE parameter: the higher its value, the faster the turning will be.

U TURN
U-turn inversion: turn change of 180° from the present followed course. When the turn has been completed, the autopilot returns in AUTO mode.

O TURN
Circle: the vessel turns on circle until this function is interrupted.

8 TURN
Double circle: the vessel execute an “eight” figure (a complete circle in one direction, and another in the opposite) until this function is stopped.

Remote Portable Control RS32

The autopilot becomes moreover flexible and practical if equipped with the hand-held remote control.
This optional device, equipped with 8 meters of cable, enables a full mobility on the control deck without loosing the control of the navigation system.
By pressing the **DODGE** key, you can switch from the present operating mode (e.g. **AUTO**, **NAV**, **AUTO-TRACK** etc.) to the **STANDBY** mode and vice-versa.
Press the two keys (P as port, S as starboard) in order to action immediately the rudder in a way which depends from the operating mode selected at that time on the autopilot:

- in **STANDBY** the rudder is moved directly and then it is left in this final position,
- in **AUTO**, **AUTO-TRACK**, **NAV** and **WIND** the rudder is moved but at the release of the key, the autopilot is newly in control and converges to the starting course.

The running operating mode of the autopilot is signaled by the led of the hand-held remote control:

- ON: **STANDBY**
- OFF: **AUTO** / **AUTO-TRACK** / **NAV** / **WIND**

- FLASHING: during the pressing of the two keys (**P** and **S** and the following seconds.

Remote Control RC34, RS34

It is similar to the RS32: it differs from it for the fact that is designed to be flush-mounted and the **P** and **S** key here are replaced by a joystick.
Since the RC34/RS34 is flush-mounted, in case of rough waters the tiller is usually easier to operate then the keys.

Signaled alarms

The autopilot is able to signal and manage within possible limits, any anomaly in the system. It signals every kind of alarms to the Captain by control unit display.
Of course, in any kind of electrical alarms, causes must be verified by checking also electrical connections (short-circuits, interruptions, oxidations and uncorrected wirings).
Even if of instinctive understanding, in the final section of this manual there is an explanatory chart with possible remedies.

NAVICONTROL
AP3003 gold
AUTOPILOT

INSTALLATION MANUAL

INSTALLATION PROCEDURES

The autopilot is powerful and sophisticated but its reliability strictly depends on a scrupulous installation and a proper configuration, of all devices and optional accessories included.
For safety reasons, the best way is to section the power supply of the processor box (and so of the whole autopilot) with a switch installed in the electric panel of the vessel, only for this purpose.

Control Unit

This is the 'cockpit' of the autopilot, and is through this unit that who is in commands instructs the system about the operations that must be executed.

Install the Control Unit in a position, on the main deck, where it will be easily reached and controlled: carefully chose the proper location and orientation so that the display will be perfectly readable from the operating position.

If the Control Unit is installed making use of the provided bracket, the visual angle can be easily varied by the user himself when necessary.

If the Control Unit is flush-mounted in the board panel, special attention must be given to the placing angle in order to ensure a perfect reading of the display. Even if the display has the back-light, if badly oriented the reading of all information data will be difficult.

The Control Unit is splash-proof, but it is not supposed to operate UNDERWATER! Thus, if externally installed, take care to position it in a shielded area with its protective cover.

The Control Unit must be connected to the Processor Box in the **TB7 CONTROL UNIT1** connector.

Control Unit (as OPTIONAL remote control)

An optional extra Control Unit must be installed with the same cares adopted for the first one.

Even if it is named remote control, it is identical to the main Control Unit both physically and functionally.

The second Control Unit must be connected to the Processor Box in the **TB8 CONTROL UNIT2** connector.

Processor Box AP gold

It is the heart and the brain of the autopilot: in fact it contains the main calculator of the system.

Install it far from direct heating, continuous vibrations and shocks; places like engine-room, bilge area or other similar locations must be avoided.
If the vessel is provided with a reversing electro-hydraulic actuator, it is necessary to position the Processor Box in an airy room. In fact, according to the actioning and the power required by the actuator, it is normal that the Processor Box overheats considerably (up to 50-60 Celsius degree).
We also recommended installing it in a place easy to be reached in order to allow the future installation of optional devices.

In order to avoid interference on radios, we suggest positioning of the processor box far from VHF aerials (few meters are sufficient).

Fluxgate Compass FGX90/3, FGX90N

As you can easily understand, it is another key device of the autopilot.
It is based on the electronic compass bearing that the autopilot keeps the vessel on the planned course, applying any needed correction, bringing you to the expected destination. An improper installation of this device will negatively affect the performances of the whole navigation system.
The compass fluxgate FGX90 can be used with wood, fiberglass and aluminum vessels. We suggest you to use the pick-up coils FGX60 for all the iron or steel vessels provided with a planar magnetic compass, externally gimbaled, correctly functioning and compensated.

As it is a magnetic compass, the first care will be the choice of location. It differs from the other electronic devices because it must be placed far from iron masses, magnetic fields and any device originating magnetic noises. The minimum distance to be taken from this possible interference is proportional to the intensity of noise and must be found at any time by way of experiment (e.g. by using a magnetic compass).

The magnetic fluxgate compass FGX90 must be connected to the Processor Box, **TB4 COMPASS** connector.

Rudder Angle Transducer FB30, FB31

This is another key element of the autopilot. In fact it is mechanically linked to the section of the rudder, and it informs the system on its real position.

It is fundamental that it is installed on a firm, rigid support respecting precisely the suggest mounting scheme.

Any slack both on the coupling bar and the rudder sector must be eliminated or this will falsify the measured rudder angle and the whole system will become inaccurate and critical.
The excursion time of the rudder from hardover to hardover must be not less than 12 seconds or more than 18 seconds, otherwise the system will be instable.

This transducer must be linked to the Processor Box, **TB5 FEEDBACK** connector.

Electrohydraulic Unit

For a correct use of our autopilot and in order to obtain the best performance, we suggest you to use hydraulic units suitable to the vessel steering system.
The flow-rate is the most important parameter when you choose a pump: it must be calculated to obtain a hardover to hardover time of about 12 seconds (±10/15%).
This is the formula to be used:

FLOW-RATE (liters/min) = RAM_VOLUME (liters) x 5
FLOW-RATE (cc/min.) = RAM_VOLUME (cc.) x 5

When you use Ax or Crux Navicontrol.it pumps, you don't need any calculation: you must choose the pump with the nearest value to the ram volume (i.e.: RAM = 100cc. ➔ PUMP = R100 or CR100).
The CR pumps (constant running) can be installed on every kind of boat and are mandatory for heavy or working vessels.
The R pumps (reversing) can be installed only on small pleasure vessels and, in any case, no more than 15mt. (50 feet) length over all.
The electronics and the software provided with the autopilot are suitable to drive the most popular 2 types of rudder activating:

<u>Constant running (CR model with solenoid valves)</u>

Software: no setting (it is the default configuration).

Wirings:

- SOLENOIDS: **TB11** connector, Processor Box.
- MOTOR: **CR. MOTOR** faston connectors, Processor Box.
- Possible CLUTCH: **TB11** connector, Processor Box.

<u>Reversing (R model)</u>

Software: change the value of the function **HYDR UNIT** (installation menu') with the value **REV1**. Use the values **REV2** or **REV3** respectively with fast or very fast power units.

Wirings:

- REVERSING MOTOR: **R. MOTOR** faston connector, Processor Box.
- Possible CLUTCH: **TB11** connector, Processor Box.

PRELIMINARY TEST.

After the installation of all mechanical and electrical components of the autopilot, a first testing must be executed when still anchored or at the shipyard.
In order to obtain the best performance of the system, it is necessary to carry out at least a trial at sea.

The first testing to be executed refers to the correct installation of the sensors and must be carried out in the following sequence:

Rudder Feedback FB30, FB31

When the autopilot is in STANDBY mode, the graphic bar of the Control Unit shows the reading of the sensor. By turning manually the wheel of the rudder, verify that the angle shown is identical to the real position of the rudder.
If the indication of the rudder sign is opposite to the real one, switch off the autopilot and invert the wiring connections which are linked to **TB5 FEEDBACK** connector, pin 3 and pin 4.

Rudder Indicator AR32, AR33, AR34

When the autopilot is in STANDBY mode, verify that the analogue rudder indicator indicates exactly what is shown on the graphic bar of the Control Unit: in case the analogue indicator is inverted, you must invert the two wires which are linked to the Processor Box, pin 2 and pin 3 (**TB9** / **TB10** connector).

Fluxgate Compass FGX90/3, FGX90N

When the autopilot is in STANDBY mode, the large display shows the reading of the electronic compass. Verify that there is no interference and the value indicated by the main compass is not very different. In case of significant difference, try to change the position of compass (if interfered) or by turning it on its axle until the difference is cancelled.

Electrohydraulic Unit

If it is possible, when the vessel is still at the shipyard or still anchored, position manually the rudder to the center. In AUTO mode, execute a course change of 10 / 20 degree and check that the rudder moves in the correct direction and in an intermediate position (the movement must be proportioned to the change).
In case the rudder moves in the opposite direction, invert the right and left solenoids (power unit with solenoids) or invert the wires of the motor (reversing power unit).

GPS and/or Chart-Plotter

In these instruments, select the output data to NMEA0183 standard (usually is the default configuration and no manual operation is required).
Insert a course on these instruments and verify that the autopilot receives correctly the bearing from them by placing it on NAV mode.
Obviously, in **NAV1** the autopilot will follow the course of the instrument connected to the TB1 connector of the Processor Box, nav1 input. Same thing for **NAV2**.

Wind Direction Sensor

Verify that the sensor is connected to the TB1 connector of the Processor Box, NAV2 input.
Select the "**NAV2 FUNCT**" on **WIND** (see the software installation procedures of the autopilot). Select the output data to NMEA0183 standard (usually is the default configuration and no manual operation is required) and verify that the autopilot receives the correct bearing of the wind by pressing the **NAV** key until WIND mode is selected.

Automatic compensation of the compass FGX90/3, FGX90N

The fluxgate compass FGX90 is already compensated at the factory and if correctly installed on wooden, fiber glass or aluminum crafts, it does not require further compensation.
If it is not possible to position it in an ideal location, at this stage is useful the compensation aboard.
This autopilot allows the automatic compensation without the help of a technician.
In fact, you only need to go out at calm sea with the vessel avoiding crowded areas and to carry out the following operations:

1. Switch on the autopilot in STANDBY mode and make the vessel turning slowly on circle. In order to obtain a good compensation, the maximum angular speed must not exceed the 6 degree par second (corresponding to a complete revolution taking 1 minute at least).
2. Press the **STBY** key for at least 5 seconds and wait until the display visualizes "FLUXGATE AUTOCOMP". At this stage, release the **STBY** key.
3. Wait until the vessel has carried out a complete revolution checking always that the angular speed is steady and under the maximum limit. If the vessel, during this turn should rock significantly (for instance a big wave, the passage of another vessel), repeat again the procedure.
4. Keep on turning in circle until the autopilot will display the maximum amount of the interference and the result of the compensation: Good if succeeded, bad if failed.
5. At this stage, the procedure is completed and you only need to press the **STBY** key in order to return to the normal functioning.

If the autocompensation failed (result = Bad), it means that the chosen location for the installation of the compass is too interfered and therefore the location must be changed.

Warning: the autocompensation procedure can be interrupted by pressing **STBY** key or by removing the power supply to the autopilot.

Operating parameters pre-set

This procedure allows you to pre-set the autopilot's main parameters (YAW, RUDD, C.RUDD and T.RATE) by entering some boat specifications.
These pre-settings (that are goods for about the 90% of the boats), must be fine-tuned during the first sea-trial.
You may select this procedure by entering the install menu (see next chapter) and by pressing the **NAV** key at the first data prompted.
At this time, three main parameters will be asked to you:

HULL TYPE :
- DISP (powerboat, displacement)
- PLAN (powerboat, planing)
- WJET (powerboat, waterjets)
- SAIL (sailing boat)

LENGHT MT (length over all, meters)
SPEED KN (maximum speed, knots)

Note: to set the value, use the arrow keys ◀ and ▶. To set the function, press the key **SET**.

After doing that, you may choose to confirm and store these pre-settings (by pressing the right arrow key ▶) or abort the operation (by pressing **STBY**).
All the parameters will be stored in the **PROGRAM 1**.

SOFTWARE INSTALLATION PROCEDURE

WARNING: the software installation procedure of the system is very delicate and implies a profound knowledge of its functioning. Thus, we advise you to avoid the changing of the values supplied with the default if you do not exactly know the effects.

In addition, we remind you that all parameters are pre-selected and are suitable to the majority of vessels.

In order to start the installation procedure and to change the setting of default, you must proceed in the following order:

1. Press simultaneously the keys **STBY** and **SET** for two seconds at least until 'INSTALL' is visualized.
2. Release the keys and press only the key **SET** until the required function is selected.
3. Modify the value by using the arrow keys ◀ and ▶.
4. When the setting is ended, press newly **STBY** to exit.

List of the functions:

MAGN COMP

Reading of the intensity of the compass signal: it is useful in case the FGX60/3 (pick-up) is installed instead of the fluxgate compass FGX90. It is a reading and cannot be modified.

F1 RUDDER LIM

Electronic limiting on the rudder actioning: sets the maximum rudder angle that the autopilot can reach.

F2 F/B SLACK

Slack on the rudder: sets the tolerance (dead-band) on the rudder positioning. It can be useful to increase it by very fast actionings or by relevant dragging.

F3 F/B 0 POS

Zero position of the feedback: it allows correcting a possible variation of alignment of zero between the real position of the rudder and the zero position of the feedback. Even if it is possible to execute with this function, we advise you to zero mechanically by actioning the feedback (turning all the feedback).

F4 FEEDBACK

Model of the connected feedback: FB30 (FB30 or FB31) – POTn (potentiometer) – POTr (reverse potentiometer) – OFF (no feedback).

Please note that the ON value can be setted only if the gyronav sensor is connected and enabled.

F5 HYDR UNIT

Model of electrohydraulic unit installed: SOL (with solenoids) – REV (reversing). REV can be equal to 1, 2 and 3 respectively with correct units, fast units and very fast units.

F6 ENERG SAVE

It activates or deactivates the energy saving on the control of the electrohydraulic unit: it avoids the keeping of the motor running when it is not necessary. It is particularly useful in small sailing vessels. ON activates it, OFF deactivates it.

F7 RUDDER ALR

It activates or deactivates the signaling of an eventual alarm due to a delay of the rudder actioning (signaled with 'NO RUDDER ALARM'): ON activates it, OFF deactivates it.

F8 COMP TYPE

Model of the connected magnetic compass: FG90 (FGX60/3, FGX90/3 or FGX90N) – SC2 (Smart Compass SC2N or SC2G).

F9 COMP ALIGN

Alignment of the compass: it allows to increase or decrease the reading of the electronic compass (FGX60/3 or FGX90) of a fixed quantity avoiding the physical turning of it.

F10 CMP DAMPING

Damping filter on the compass (FGX60/3 or FGX90): the higher is the value and the more filtered the compass is.

F11 INTEG TC

Time constant of the main integrating control: avoid changing it (only for qualified technicians).

F12 DERIV TC

Time constant of the main derivation control: avoid changing it (only for qualified technicians).

F13 NAV GAIN

Gain of the NAV control: avoid changing it (only for qualified technicians).

F14 NAV2 FUNCT

Selection of the function assigned to NAV2: NAV2 (navigation with the second chart-plotter), WIND (navigation with wind direction sensor) or OFF (disabled).

F15 COURSE TMR

Off-course timeout alarm: the timeout (in seconds) between an off-course (set course and heading differ of 20 degrees at least) and the start of the OFF-COURSE alarm.

F16 INFO DISPL

It selects the data on the info-display: SOG (speed over ground, received by the GPS), COG (course over ground, received by the GPS) or COMP (compass reading).

F17 RC FUNCT

Action of the remote controls (RS32, RC34, RS34 and ART35). The values are:

[STND]: when you are in AUTO, the direction keys on the remote control make a momentary change of course. When you release, the autopilot comes back to the previous course.

[5] - [10] or [20] : when you are in AUTO, the direction keys on the remote control change permanently the course for the specified amount of degrees (5, 10 or 20 degrees) each time pressed.

F18 MIN RUDDER

By setting this function the autopilot will add this value to any given rudder command.

It is useful in all the vessels that have a tendencing of not respond to a small deflection of the rudder around the midship position (for example, the waterjet propulsions).

F19 MULTI-SENS

Enables (ON) or disables (OFF) the multisensor mode (fluxgate compass + gyronav + GPS).

Please note that the ON value can be setted only if the gyronav sensor is connected and enabled.

TECHNICAL SPECIFICATION

Operating specifications.

Supply voltage	12 - 24 Vdc (-15% / + 30%)
Power consumption (electronic parts only)	4W (min) ÷8W (max)
Maximum solenoids load	4A (each one)
Maximum hydraulic unit load ("CR" type)	25A @ 12V, 20A @ 24V
Maximum hydraulic unit load ("R" type)	80 ÷ 350W, according to the model
Operating temperature	-5 ÷ +55°C
Control unit display type	transflective LCD, wide viewing angle

Inputs / outputs.

2x NMEA0183 opto-coupled inputs.
1x digital opto-coupled input, meets NMEA0183 specifications.
1x NMEA0183 output.
1x feedback input (LVDT type).
1x feedback input (resistive type).
1x analogue compass input (sin/cos type).
2x control unit connector (bi-directional).
2x analogue rudder indicator outputs.
3x solenoid outputs (left, right, clutch).
1x hydraulic power unit output, constant running model.
1x hydraulic power unit output, reversing model.

NMEA0183 sentences

INPUT (TB1 connector, Processor Box)

Function	Needed Sentences
MULTISENSOR	RMC or VTG
STANDBY	None
AUTO	None
AUTOTRACK	GGA or GLL or RMC
NAV	APA or APB or BOD+RMB or BOD+XTE or BOD+XTR
WIND	MWV or VWR
SOG visualization	RMC or VTG
COG visualization	RMC or VTG
COMP visualization	none

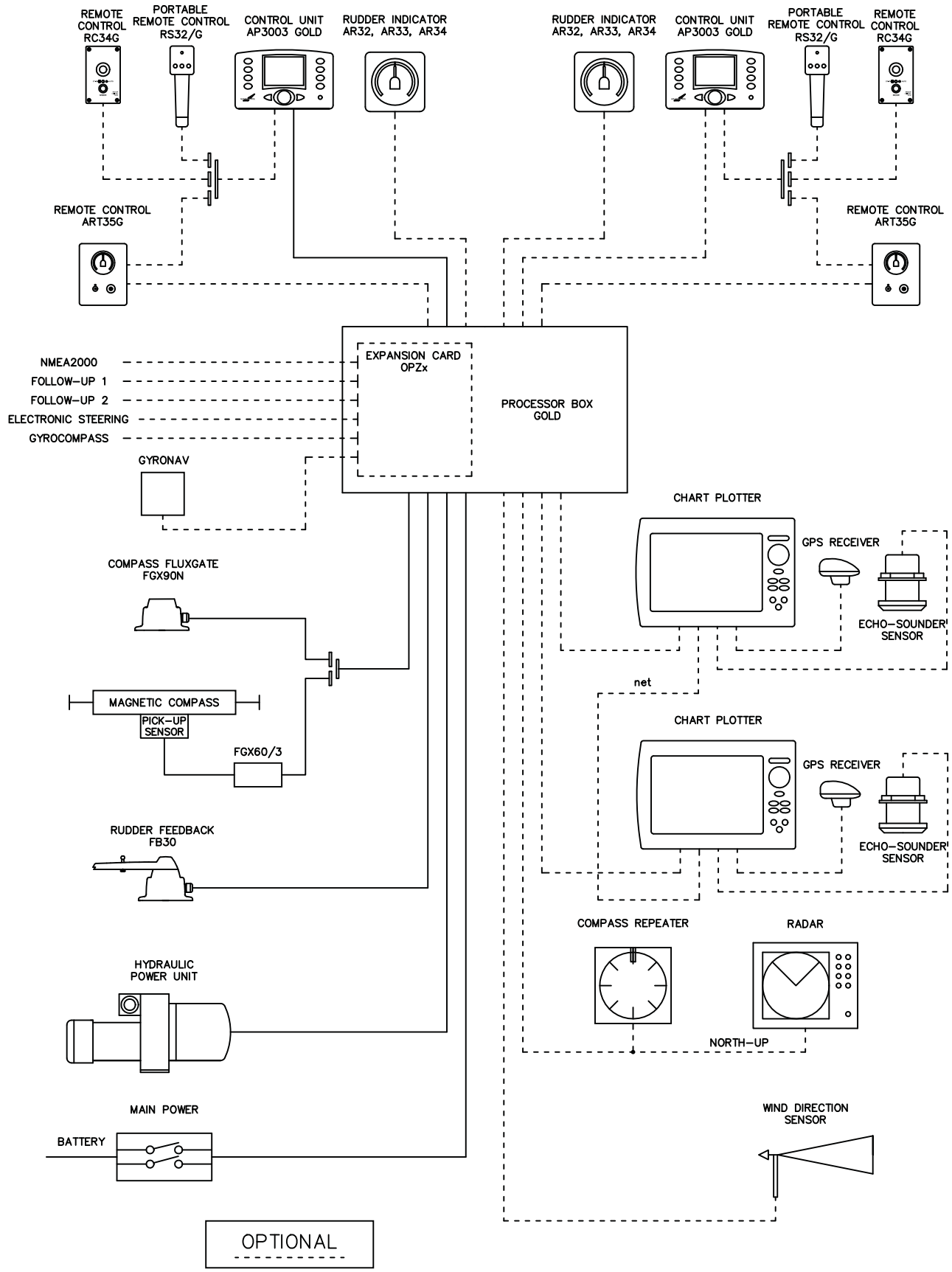
OUTPUT (TB2 connector, Processor Box)

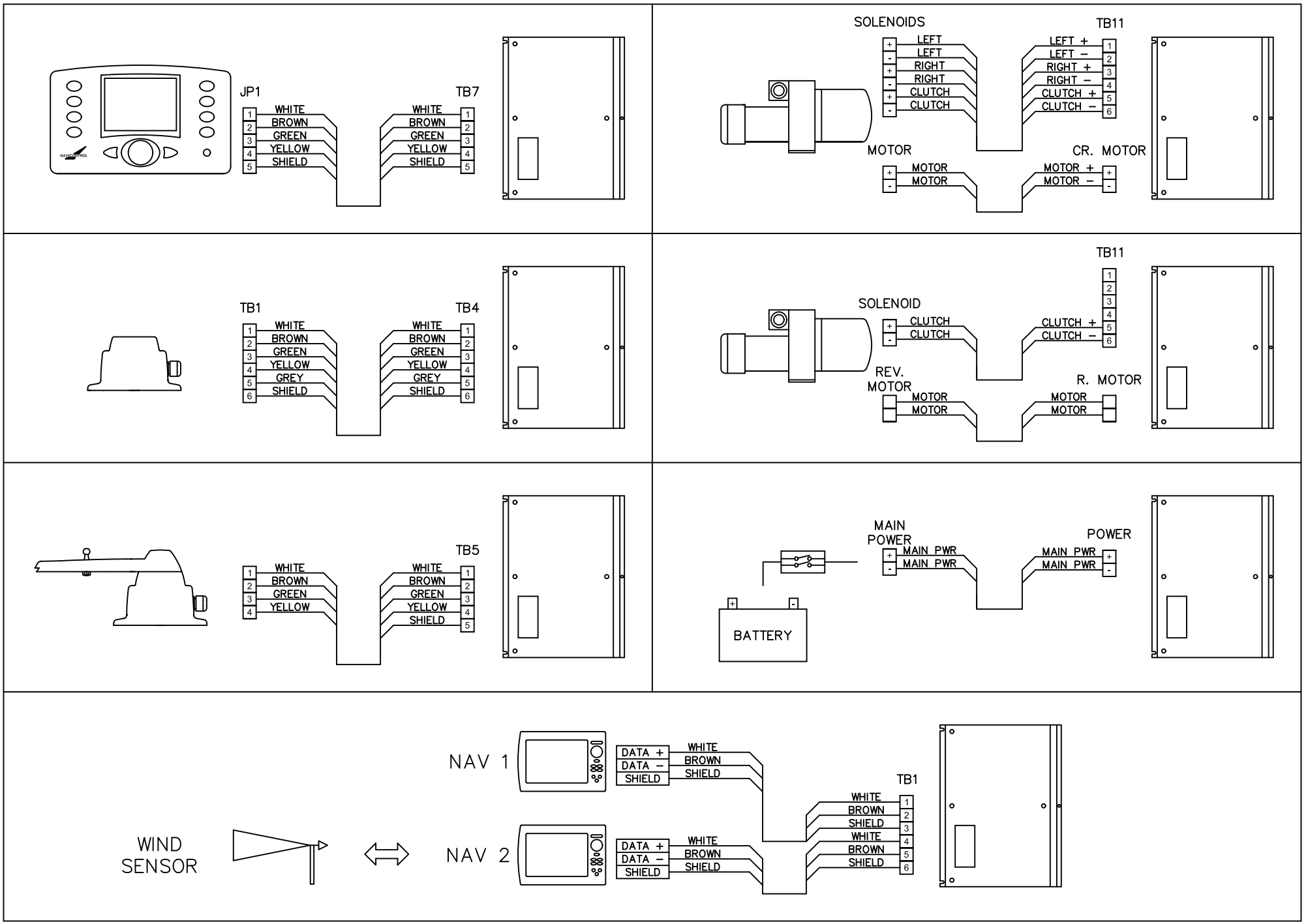
Function	Sentences
heading output	HDG (10Hz) + HDT (10Hz) + HDM(1Hz) with gyronav HDG (2Hz) + HDT (2Hz) + HDM(1Hz) without gyronav

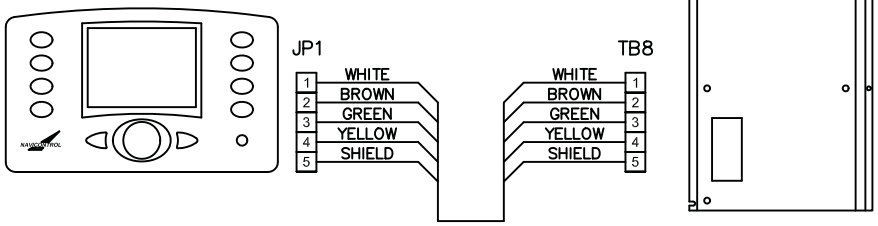
ALARMS

SIGNALING	MEANING	POSSIBLE CAUSES	REMEDY
: (two dots between the numbers of the course)	Interfered magnetic compass.	Magnetic interference nearby the compass sensor.	Remove the interference.
NO COMPASS	Lack of compass signal.	Relevant magnetic interference nearby the compass sensor or failure of the sensor.	Remove the interference. Call the technician.
TILL. FAIL	Failure on the remote control (tiller or hand-held).	Remote control keys failure. Water on the hand-held remote control.	Call the technician.
OFF COURSE	Off course.	The vessel does not enter the course in reasonable time. Possible interfered compass.	Remove the interference.
NO F/BACK	Lack of signal of the feedback sensor.	Feedback not working.	Call the technician.
NO RUDDER	The rudder does not follow the given orders.	Possible failure on the electrohydraulic unit. Presence of air bubbles in the hydraulic circuit. Excessive slack between the rudder and the feedback.	Call the technician. The discharge of the hydraulic circuit must be carried out. Tighten the mechanical connection between the feedback and the rudder sector.
NO GPS INP	Lack of GPS signal.	Possible failure on the GPS. The GPS has not yet calculated the position. The data transmission to the autopilot has been deactivated.	Refer to the GPS manual.
NO PLT INP	Lack of PLOTTER signal.	The plotter has not yet sent the course to the autopilot.	Refer to the PLOTTER manual.
NO WIND IN	Lack of WIND sensor.	Possible failure of the wind sensor.	Refer to the WIND sensor manual.
OVERLOAD	Overload of the electronic on the autopilot.	Possible short-circuit on the electrohydraulic unit or solenoids. Electrohydraulic unit unsuitable for the processor box electronic.	Call the technician.
OVERHEAT	Overheat of the electronic on the autopilot.	Electrohydraulic unit unsuitable for the processor box electronic. The location where the processor box has been fitted is insufficiently ventilated.	Ventilate the area where the processor box is installed. Call the technician.
LOW BATTERY	Low battery.	The battery is low and does not supply sufficient energy for the running of the autopilot.	Turn on the battery charger.

AUTOPILOT SYSTEM




JP1
TB7
1 WHITE
2 BROWN
3 GREEN
4 YELLOW
5 SHIELD
WHITE 1
BROWN 2
GREEN 3
YELLOW 4
SHIELD 5
SOLENOIDS
TB11
LEFT +
LEFT –
RIGHT +
RIGHT –
CLUTCH +
CLUTCH –
MOTOR
CR. MOTOR
MOTOR +
MOTOR –
TB1
TB4
6 GREY
SOLENOID
REV. MOTOR
R. MOTOR
TB5
MAIN POWER
POWER
MAIN PWR
BATTERY
WIND SENSOR
NAV 1
NAV 2
DATA +
DATA –
SHIELD


JP1
TB8
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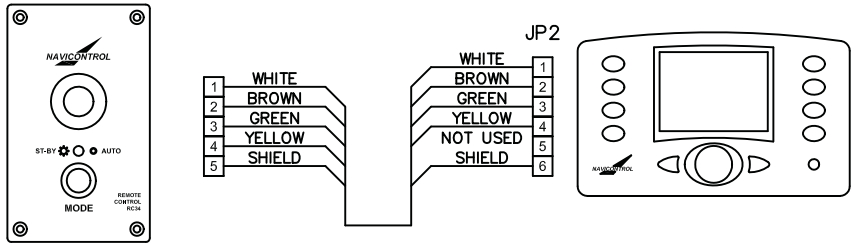
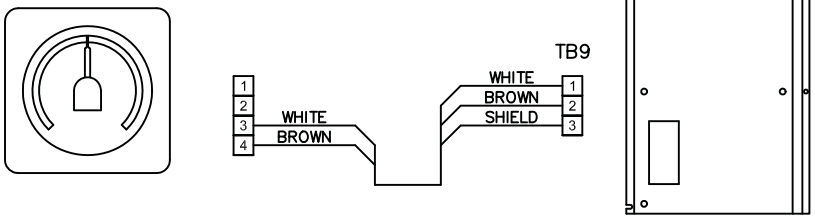
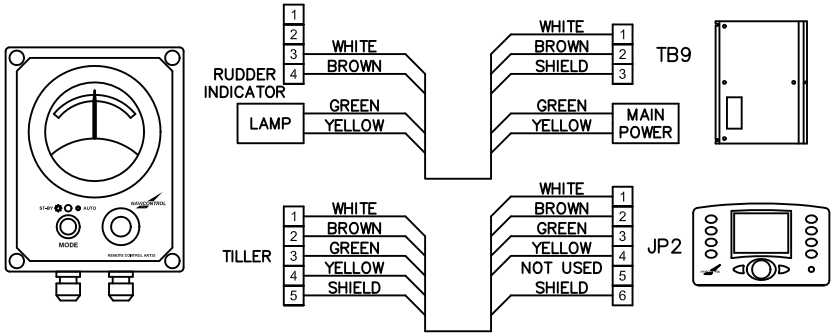
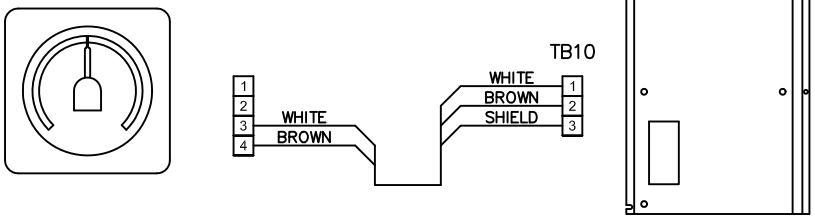
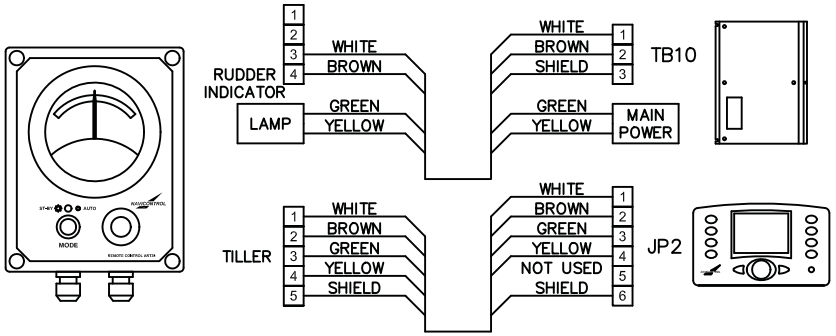
2 BROWN
3 GREEN
4 YELLOW
5 SHIELD
WHITE 1
BROWN 2
GREEN 3
YELLOW 4
SHIELD 5

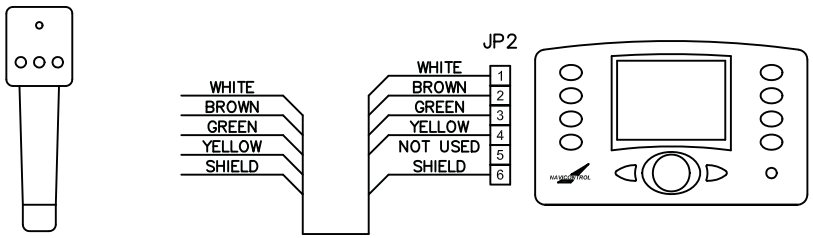

NAVICONTROL
ST-BY AUTO
MODE
REMOTE CONTROL RC34
JP2
1 WHITE
2 BROWN
3 GREEN
4 YELLOW
5 SHIELD
WHITE 1
BROWN 2
GREEN 3
YELLOW 4
NOT USED 5
SHIELD 6

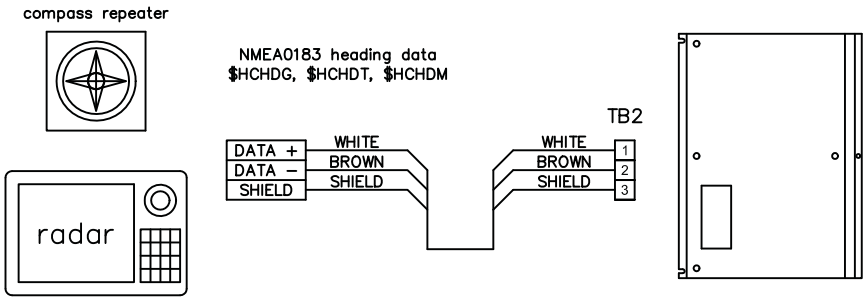

TB9
1
2 WHITE
3 BROWN
4
WHITE 1
BROWN 2
SHIELD 3


RUDDER INDICATOR
LAMP
1
2 WHITE
3 BROWN
4
GREEN
YELLOW
WHITE 1
BROWN 2
SHIELD 3
GREEN
YELLOW
MAIN POWER
TB9
TILLER
1 WHITE
2 BROWN
3 GREEN
4 YELLOW
5 SHIELD
WHITE 1
BROWN 2
GREEN 3
YELLOW 4
NOT USED 5
SHIELD 6
JP2

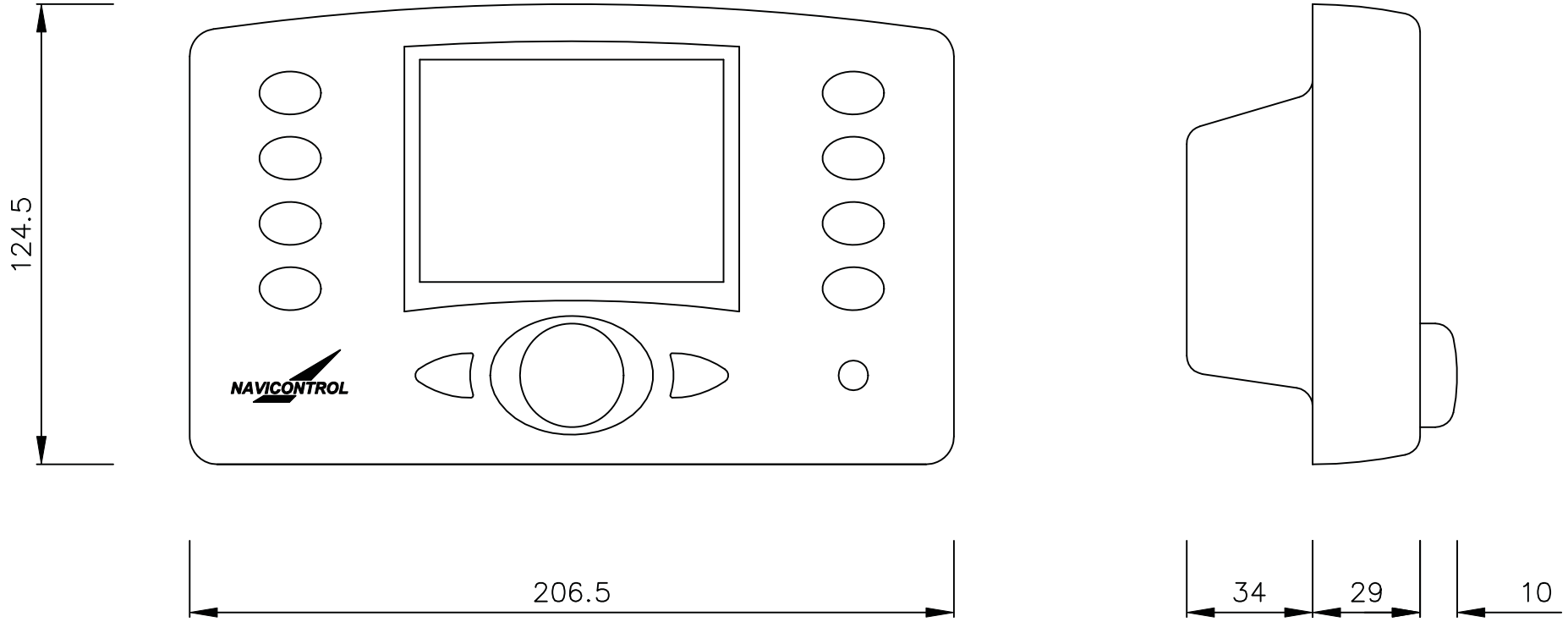

TB10
1
2
3 WHITE
4 BROWN
WHITE 1
BROWN 2
SHIELD 3


RUDDER INDICATOR
LAMP
1
2
3 WHITE
4 BROWN
GREEN
YELLOW
WHITE 1
BROWN 2
SHIELD 3
GREEN
YELLOW
MAIN POWER
TB10
TILLER
1 WHITE
2 BROWN
3 GREEN
4 YELLOW
5 SHIELD
WHITE 1
BROWN 2
GREEN 3
YELLOW 4
NOT USED 5
SHIELD 6
JP2


JP2
WHITE
BROWN
GREEN
YELLOW
SHIELD
WHITE 1
BROWN 2
GREEN 3
YELLOW 4
NOT USED 5
SHIELD 6


compass repeater
radar
NMEA0183 heading data
$HCHDG, $HCHDT, $HCHDM
TB2
DATA +
DATA –
SHIELD
WHITE
BROWN
SHIELD
WHITE 1
BROWN 2
SHIELD 3

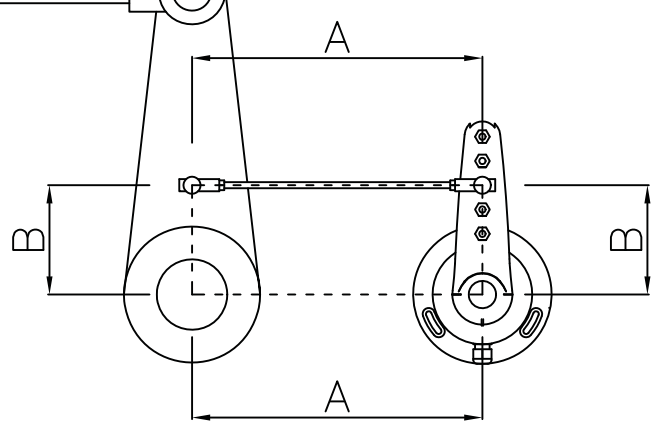
AP3003 GOLD
CONTROL UNIT DIMENSIONS



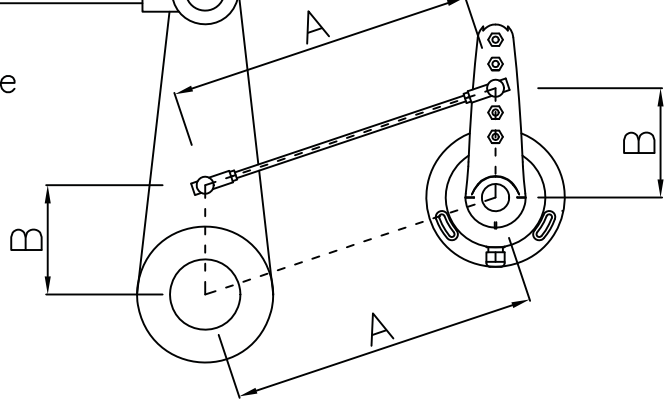
RUDDER FEEDBACK FB30 mechanical installing / installazione meccanica

Measures A and B are MANDATORY for the correct performance of the autopilot.
Il rispetto delle misure A e B e' OBBLIGATORIO per il corretto funzionamento dell' autopilota.

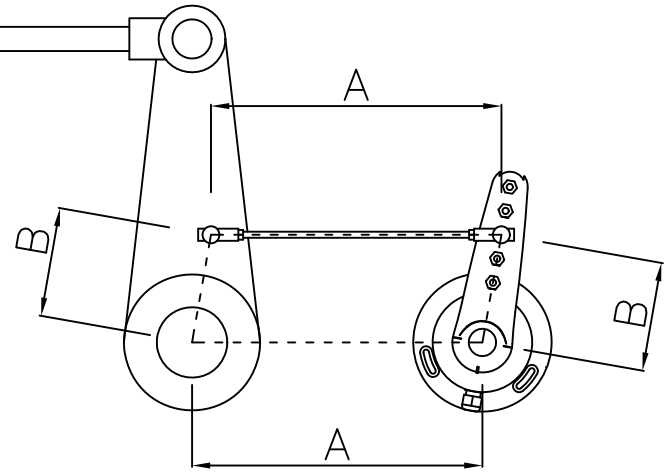
1st case



2nd case



3rd case



4th case